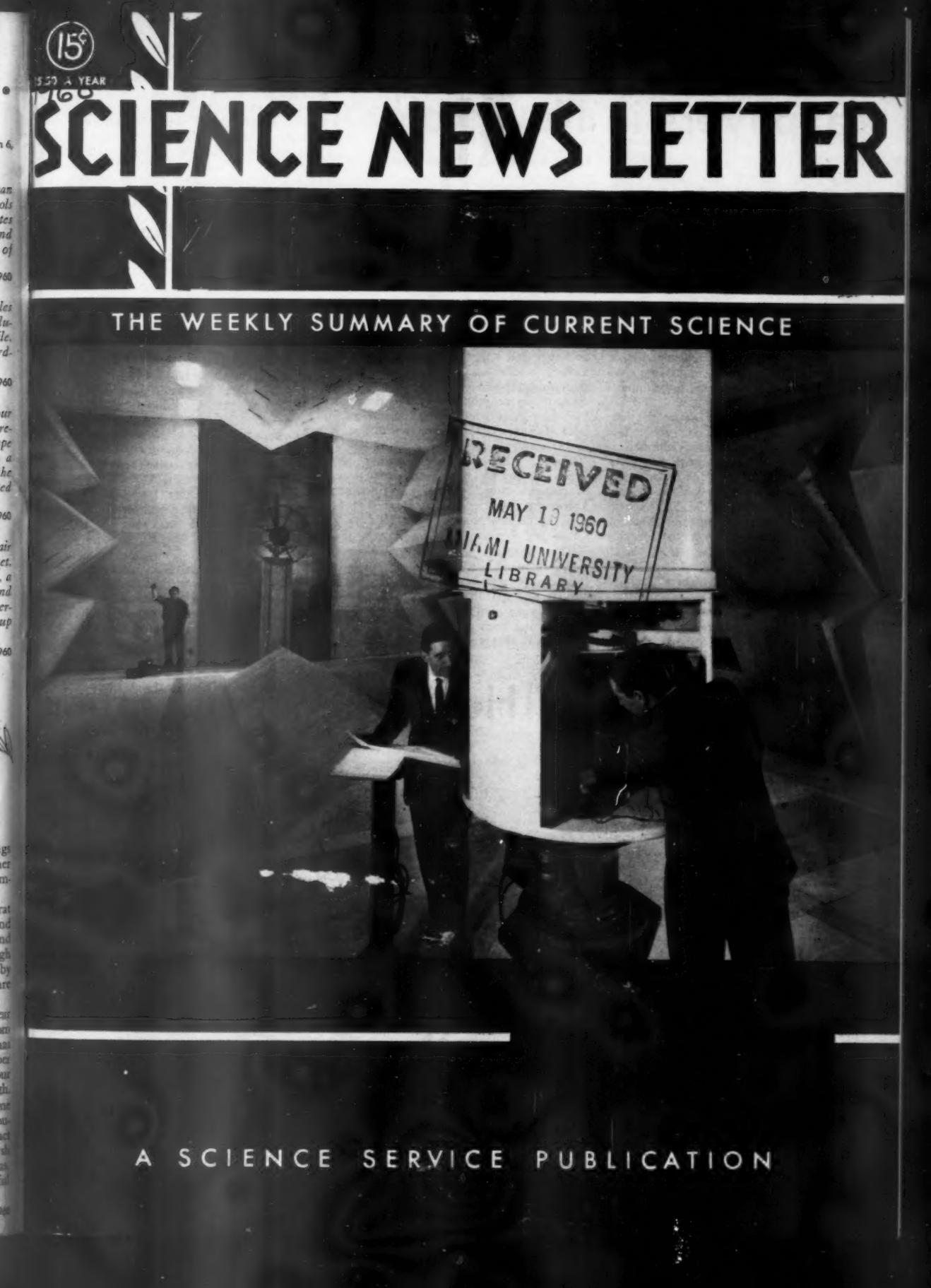


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SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



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GENERAL SCIENCE

Taxpayers in New Role

TEN YEARS AGO, American taxpayers through their elected representatives decided that basic scientific research needed a big boost. So they set up the National Science Foundation and, through it, began paying the bills for advanced research on subjects from the slave-making behavior of ants, and its population consequences, to the mechanics of the atmosphere.

The taxpayer, of course, picked up the tab: \$3,500,000 in the first year, growing to \$152,773,000 for the current year.

In this, the taxpayer was doing a bold thing. He was and is patronizing science in the manner that czars and kings and noblemen and, more recently, governments have.

In doing this, Americans upset the predictions of some foreign observers. The observers had said a democracy devoted to equality would not promote the pursuit of knowledge and would not lift up and support its best minds with special favors.

But American taxpayers did. They set up the foundation and then encouraged its expansion, an expansion phenomenal even for a Government agency. The present headquarters on Constitution Avenue, with additional workers on 23rd Street, may soon be further expanded.

The foundation makes studies and policy suggestions and reviews the great number of requests for funds for research. It does not do research itself but makes grants to pay the bills for important research that cannot get private support.

The foundation has also found that to support research adequately, it must also support research facilities. In astronomy, for instance, the foundation is currently supporting the National Radio Astronomy Observatory in Green Bank, W. Va., and the Kitt Peak National Observatory near Tucson, Ariz.

Generally, scientists and close observers of science in America have had praise for the foundation's work. But there have been critics too.

The foundation has been applauded for the manner in which it has carried out its primary responsibilities: the awarding of research grants and fellowships.

Criticism, when it has come, has come mainly from scientists who had hoped the foundation would take a major position in forming science policy for the country. When Congress approved the foundation, Congress instructed it, in a manner that has been open to varying interpretations to establish science policy.

The foundation itself has taken a fairly conservative view of its own power to make policy. Whether the foundation could take a more aggressive position without upsetting Congressional applecart is open to serious question.

But there is no question that the foundation has provided an important stability to American science. Scientists with important work to do now know where to go for help. In 1960, these scientists got an aver-

age of \$30,500 for an average period of 2.3 years per project.

The foundation was able to support 26% of the proposals received.

The foundation is also working to improve America's schools by supporting training of high school teachers. Funds are also used to help train graduate students, to train college teachers and to improve the content of courses in colleges.

And the foundation has moved to end the "translation gap." The foundation supports the cover-to-cover translation of 35 key USSR scientific journals. And it is making a series of studies of the organization and publication of scientific research in every major geographical area in the world, including the Soviet Union, Poland, mainland China, Czechoslovakia, Yugoslavia and Hungary.

Today, Americans are opening their wallets to pay for basic research, that type of research aimed primarily at increasing knowledge in science—the kind of work done by Galileo, Newton, Maxwell, Faraday, Gibbs and Einstein.

These scientists' work in the past revolutionized man's life, work and thoughts. The faith of the National Science Foundation is that its support of today's scientists will improve man's life tomorrow.

A lot has been done. Still, Dr. Alan T. Waterman, director of the National Science

PUBLIC HEALTH

Oil Helps Survive Radiation

VICTIMS OF RADIATION sickness may be treated in the future with remedies as simple as olive and peanut oils.

This possibility was indicated in recent experiments by Dr. James K. Ashikawa described at the national meeting of the Radiation Research Society in San Francisco, Calif.

The scientist, a biophysicist at the University of California Donner Laboratory in Berkeley, found that mice could survive lethal doses of X-rays through treatment with common edible vegetable oils and with methyl oleate and triolein, chemically pure synthetic oils.

He got best results, he said, by injecting the oil—in an amount equal to about one-thirtieth of the mouse's total body weight—directly into the abdominal cavity of the irradiated animals.

As many as 90% of the treated animals survived a moderate X-ray dosage, compared with only 45% survival in untreated mice. And after still stronger irradiation, which killed all the untreated animals, some seven percent of those that received injections were able to survive the lethal rays.

Effective chemotherapy for radiation victims is badly needed, Dr. Ashikawa said. There is little chance for predicting a peacetime nuclear accident or a nuclear war.

Foundation, warns in *Science*, 131:1341, 1960:

"The problems inherent in science and technology cannot be dismissed on the assumption that they can be met by the Federal Government without understanding, support, and local action by informed citizens."

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ASTRONAUTICS

U. S. Leadership Depends On Space Agency and AEC

UNITED STATES leadership in the conquest of space depends upon the close cooperation of the Atomic Energy Commission and the National Aeronautics and Space Administration, a former AEC Commissioner charges.

Dr. Willard F. Libby of the University of California, Los Angeles, said that the AEC and NASA, working together, can keep the U. S. ahead in space exploration by maintaining a strong educational program to provide adequate numbers of scientists and engineers trained in applications of atomic energy to space. The AEC has done this successfully for many years in such fields as nuclear reactors, he reported.

"Far more important" than the development of a rocket engine with a million-pound thrust, Dr. Libby said, is whether the next generation of engineers and scientists will be "interested in space."

Few possibilities of the world today are as exciting as some of the peacetime uses of space, Dr. Libby concluded.

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And the "anti-radiation pills" currently available, compounds containing the sulfhydryl group, have no effect unless they are taken before the radiation exposure occurs.

Still unexplained is the exact mechanism by which injected fats can ward off radiation sickness, although the scientist suspects the answer may possibly lie in a biochemical action involving the cell membranes, which are known to be attacked and weakened through radiation exposure.

The highest therapeutic values, Dr. Ashikawa reported, came from olive oil in which the content of stearate, a saturated fat, was increased by the addition of pure methyl stearate. Studies showed that stearate may also play a natural role in the body's defense against radiation damage, since irradiated but untreated animals were found to have a higher stearate content in the blood stream with a corresponding lower content of oleate, an unsaturated liquid fat.

In continued work, the scientist will attempt to explain the physiological mechanism through which the treatment operates and will search for more active chemical agents. Eventually, he believes, a combination of chemicals and other methods may prove to be the best therapy for human victims of radiation sickness.

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PSYCHIATRY

Make Alcoholics Face Facts

Alcoholics lie about their drinking without knowing it. Parents often encourage delinquency, and a blood factor in schizophrenia has been found.

IN ORDER to cure chronic alcoholism, it is first necessary to find some way to make the patient face the fact that he is an alcoholic, Drs. Robert A. Moore and Thomas C. Murphy of the University of Michigan Medical Center, Ann Arbor, told the American Psychiatric Association meeting in Atlantic City, N. J.

An alcoholic is often accused of lying because he denies the obvious reality of his uncontrolled drinking. But actually he is not conscious that he is lying, the psychiatrists explained.

It is psychologically vital to the patient to go on drinking and so he must fend off all awareness of the harm it is doing to him. He is reluctant to admit that his drinking is a problem and unwilling to accept any help.

The psychiatrists reported a study of 100 male alcoholic veterans for an average of three and a half years after discharge from the hospital. At that time 14 were significantly improved, 21 slightly improved, 33 unimproved, seven in other hospitals, seven dead, nine in jails and nine lost.

The degree of improvement of the patient was found to be significantly related to the degree to which he had become able to face the fact of his alcoholism. Success with Alcoholics Anonymous, the remedy Antabuse, or the state hospital programs is

related to effectiveness in diminishing the patients' denial of their problems.

Since only a small percentage of alcoholics are able to accept any treatment approach, new techniques must be devised to combat effectively the tendency of the patient to deny his alcoholism, the psychiatrists urged.

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Parents and Delinquency

A STUDY of 400 juvenile delinquents in a mental hospital showed with "regular frequency" that the parents unconsciously fostered the delinquent behavior in their own children, Drs. Donald J. Carek, Willard J. Hendrickson and Donald J. Holmes of the University of Michigan Medical Center told the American Psychiatric Association meeting in Atlantic City, N. J.

The parents show an addiction to the child's delinquency that is much like drug addiction. They even suffer acute "withdrawal symptoms" when psychiatric treatment results in the child's abandoning his delinquent behavior.

Then the parent is likely, unconsciously, to find excuses to interrupt the treatment or place obstacles in the way of its progress.

This unconscious interference by parents is one of the major difficulties in treating

the child and his parents, the psychiatrists reported.

They said that as the method for treating delinquent adolescents improves, it becomes necessary to develop more effective treatment for his frantic parents suffering from sudden withdrawal of the unconscious satisfaction provided by the child's behavior.

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Blood Factor in Psychosis

HOPE THAT THE FUTURE may provide a way of preventing or possibly even curing the common mental disease schizophrenia was seen in a report to the American Psychiatric Association meeting in Atlantic City, N. J.

"Steps Towards the Isolation of a Serum Factor in Schizophrenia" is the modest title of the report by Drs. Charles E. Frohman, Elliot D. Luby, Garfield Tourney, Peter G. S. Beckett and Jacques S. Gottlieb, all of the Lafayette Clinic in Detroit, Mich.

The research team studied chronic schizophrenic patients under insulin stress and found a defect in metabolism which affects the conversion of chemical to kinetic energy.

Further research indicated that the defect may be caused by a substance in the blood of the patient. If this substance in the blood is a partial cause of schizophrenia, this finding would make it possible for physicians to spot the future schizophrenic before he develops the disease. Thus, the physician might be able to prevent the disease's development, psychiatrists believe.

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PSYCHOLOGY

Russian Animals Trained To Signal Body Condition

RUSSIAN scientists were reported to have the know-how for training space animals to send messages about their physical conditions to ground stations.

The Russian know-how was described at a meeting at Columbia University by Dr. Gregory Razran, chairman of the department of psychology at Queens College. He has been analyzing Soviet research under a grant from the National Institutes of Health.

He said the Russians can condition animals to perform certain acts when their blood pressure or rate of breathing changes. He said a dog in a satellite could be conditioned to push a lever or button with his paw to signal his physical condition.

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PSYCHOLOGY

Four Years in College Changes a Student

FOUR YEARS in college change the behavior of students considerably and the change is in the direction favored by teachers. This was found when Drs. Ralph M. Rust and James S. Davie of Yale University measured the behavior of students on a behavior inventory. The inventory contains 220 items, making up 17 scales that cover a wide range of behavior.

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BRAIN-BEHAVIOR—Dr. James Olds of the University of Michigan reported on the effect of electric stimulation of various areas in the brain on the behavior of rats. His report was carried by closed circuit television directly from Ann Arbor, Mich., to the American Psychiatric Association meeting in Atlantic City, N. J.

MEDICINE

Deaths Wrongly Blamed

THE MAN who administers the anesthetic during surgery is often wrongly blamed for deaths that occur during or after an operation.

Operating room mortalities are so "loosely" reported that the exact cause of death is often overlooked. Many are erroneously recorded as anesthetic deaths, Dr. Joseph E. Campbell, pathologist of the office of the Cook County coroner, Chicago, told colleagues attending a meeting of the International Anesthesia Research Society in Washington, D.C.

He based this conclusion on the results of a joint 30-month post-mortem study in Philadelphia with Dr. William A. Weiss, District of Columbia General Hospital, Washington, and Dr. Frederic Rieders of the Office of the Medical Examiner in Philadelphia.

The study showed that of 645 deaths reported associated with anesthesia, the pain-

killers were the sole or major factor in only 28 of these deaths.

When a post-mortem examination fails to reveal the cause of death, it is usually presumed that the anesthetist was at fault and lacked the necessary skill for his job. This conclusion is entirely unjustified, Dr. Campbell said. The anesthesiologist should not be blamed for the inadequacies of the examining pathologist, he added.

In the first place, a routine hospital autopsy is not an adequate method of determining the cause of death. The anesthesiologist can be protected from erroneous assumptions, however. Dr. Campbell suggested that compulsory reporting of such cases to the medico-legal agency with thorough post-mortem studies would offer such protection. No death should be attributed to excessive anesthesia unless an autopsy, by scientific findings, confirms this as the sole or major cause, he said.

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MEDICINE

Brain's Heart Control Area

FOR THE FIRST TIME, specific brain areas which influence the heart rhythm have been pinpointed and their role in such serious conditions as "racing heart" and premature heartbeats have been more clearly defined.

Drs. S. J. Weinberg and Joaquin M. Fuster of the University of California Medical Center, Los Angeles, have reported these findings.

A tiny brain segment—less than a cubic inch—known as the hypothalamus, has long been suspected of playing an important role in regulation of vital organs such as the heart and kidney. Just what precise areas in the segment influence the heartbeat were not known.

The investigators placed tiny electrodes in various clumps of hypothalamus cells of experimental animals and electrically stimulated them. Effects of this on the heart were observed on the electrocardiogram.

Stimulation of certain of these brain cells, chiefly in the lateral and posterior

hypothalamus, produced electrocardiograms similar to certain clinical heart conditions in humans. These included premature heartbeats, "racing heart," and irregular heartbeats similar to those caused by an excess of such heart drugs as quinidine.

The hypothalamus is, among other things, a way-station for reactions accompanying the expression of emotions, Dr. Weinberg points out. Through excitation of these tiny clumps of hypothalamic cells, emotions may cause irregular heart rhythms.

Thus patients suffering from these aberrations of the heart's normal function should in some cases be treated for emotional disorders as well as for any basic heart disturbance.

The pinpointing of these brain areas which influence the heart function may also lead to a more effective means of evaluating drugs which will correct irregular rhythms. Such drugs may act on these particular groups of brain cells.

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MEDICINE

Accident of Nature

A CHEMICAL "accident of nature" responsible for pentosuria—a mild and non-disabling disease characterized by excess sugar in the urine—has been partially pinpointed by scientists from Beth Israel Hospital and Harvard Medical School in Boston.

Their findings provide a new means of detecting carriers of the disease trait and a way to distinguish pentosuria from diabetes. In pentosuria, patients excrete large amounts of L-xylulose, a sugar-molecule with five carbon atoms. Diabetics excrete excessive glucose, a sugar molecule with six carbon atoms.

People with pentosuria apparently cannot convert L-xylulose to an alcohol called xylitol because they lack the enzyme that catalyzes the reaction. The presumed reason they lack the enzyme is that they lack the gene controlling the production of the enzyme.

Research supported by the American Cancer Society and headed by Dr. Howard H. Hiatt showed that normal people excreted no L-xylulose when fasting and very little after eating. Pentosurics showed substantial amounts of L-xylulose in both blood and urine while fasting and seven or eight times as much after eating.

The apparently normal relatives of the pentosurics showed practically no blood or urine L-xylulose while fasting but registered several times as much as the normals and about five percent as much as the pentosurics after eating.

The results indicated that pentosurics acquire the gene defect from both parents. The presumably non-pentosuric relatives, who inherited the gene from only one parent, had a hidden and extremely mild pentosuria. They inherited enough of the enzyme-forming potential from the normal parent to metabolize L-xylulose well but, as carriers of the gene defect, they could pass the disease trait along to their offspring.

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PSYCHIATRY

Healing When Depressed

Depression of manic depressives is thought to be caused by pampering. Babies with sleeping difficulties tend to have same problem later in life, and sniffing can be psychological.

WHEN PERSONS who suffer from manic-depressive illness fall into a depressed state, they are not getting worse but are healing, a psychiatrist reported to the American Psychoanalytic Association meeting in Atlantic City, N. J.

Dr. Philip Weissman, a psychiatrist of the Affiliate Staff of the New York Psychoanalytic Treatment Center, said he had found that in certain cases mania seemed to be the basic illness.

Manic-depressive illness, also called cyclothymia, has generally been considered as having two phases—mania and depression. Depression has been thought the basic, more serious, part of the illness. Mania has been regarded as the end of a manic-depressive sequence.

Classical psychoanalytic concept tells that before the development of this illness, in the infantile stage, one depression sets the pattern for later ones.

Dr. Weissman said that early development in the cases he studied showed that the manic patterns of behavior stemmed from mothers being "over-good" to the child.

He said that depression comes along when the idea of pleasure from "too good" treatment by mother is denied by the world of cold reality. As a result, the depression, which is a strengthening of the ego, or self, develops.

He added that psychoanalytical therapy is more effective during the depressive period.

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Babies Sensitive to Sound

SOME BABIES who have difficulties in sleeping, especially at night, are very sensitive to sound, it was reported to the American Psychoanalytic Association meeting in Atlantic City, N. J.

Through contact with parents, Drs. Mildred H. January of Hartford, Conn., and Betty Huse of Washington, D. C., studied the disturbance of sleep in babies aged 11 to 14 months.

They found that these babies were extremely sensitive to stimulation of the senses and proved to be of very superior intelligence when tested later in childhood and adolescence.

All the babies with sleeping difficulties had also had feeding difficulties since shortly after birth.

Another factor found in all the cases was that the sleep disturbance in the babies first occurred after mother and child had been separated over one night.

A 10 to 15 year follow-up of the children seemed to show a tendency toward re-

curring psychological problems including inability to sleep.

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Psychological Sniffing

TO A PSYCHOANALYST, a patient's sniff means more than the need for a handkerchief.

Dr. Jack Sheps, psychiatry instructor at the College of Physicians and Surgeons of Columbia University, told the American Psychoanalytic Association meeting in Atlantic City, N. J., that exploration of the patient's associations to his nasal congestion will do much to undo his lifelong clinging to infantile fears. This new information is important in treating certain neurotic states and some schizophrenic cases.

Dr. Sheps said there is a close correlation between the nose and the mouth and thus sensations in the nose can revive infantile recollections. This helps patients gain awareness of unresolved fears stemming from early experiences, the instructor said.

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BACTERIOLOGY

Test for Strep Throat

A QUICK new method to test for streptococci in infected throats was reported to the Society of American Bacteriologists meeting in Philadelphia. The new test may protect thousands of persons from rheumatic fever, which strikes only after a strep infection.

Earle K. Borman, director of the laboratory division of the Connecticut Department of Health, Hartford, said that with the method the Health Department Laboratories are making identifications within 24 hours after specimens are received.

The basic principle of the method is not new, Mr. Borman said. The original work was done in 1950 by Drs. A. H. Coons and M. N. Kaplan of the Harvard University Medical School.

But identification of the streptococci causing rheumatic fever by the Coons-Kaplan method was complicated by the fact that several types of organisms, including staphylococci, had the same fluorescent appearance when viewed in a microscope.

In Connecticut the new method was worked out by Mr. Borman, John J. Redys and Dr. Martin R. Ross. They used a culture medium in which staph will not multiply and in which a non-fluorescent agent is used to prevent the reaction of streptococci other than the Group A,



MINIATURIZED INSTRUMENTS
—Simultaneous recording of body functions is possible with the instruments worn on the belt of the flyer. Developed by scientists at the Boeing Space Medicine Section, Seattle, Wash., the instrument belt is adaptable to space flight.

which may be a forerunner of rheumatic fever.

The rapid, relatively simple technique can be adopted by public health and medical laboratories in other states, Mr. Borman said, so that physicians will be provided with the information they need for more effective treatment and control of rheumatic fever and rheumatic heart disease.

If the dangerous Group A streptococci are thoroughly eradicated with sulfa drugs, penicillin or other antibiotics, rheumatic fever can be prevented.

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Hybrid Bacteria

TWO KINDS of bacteria have been shown able to mate and produce hybrid offspring in the intestines of mice, it was reported to the Society of American Bacteriologists meeting in Philadelphia.

Herman Schneider of Walter Reed Army Institute of Research said he created conditions in the intestine of a mouse in which both parent types could multiply in large numbers. He was able to recover the offspring, living proof that the cross-mating had actually taken place.

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GENERAL SCIENCE

Youth Explores Space Age

MAYBE YOU were born too late to look forward to exploring the future predicted by space-age scientists. But you could have traveled a long way into those hidden frontiers by walking, slowly and thoughtfully, through the aisles at the National Science Fair-International at Butler University Fieldhouse in Indianapolis on May 11.

The scientific world's newest ideas and problems were prominent among 370 top level projects exhibited by teen-age finalists representing nearly 200 large regional and area science fairs. These creative and knowledgeable young people were sophomores, juniors and seniors in high schools all over the United States, and in Canada, Japan, Thailand, and the Army Dependents Schools in Europe.

In return for an hour or two of examining colorfully dramatic exhibits and talking to the young people, who constructed these demonstrations of their work, you would have left the National Science Fair with a feeling of having experienced tomorrow—or the next century.

A complete system worked out by David J. Wilson, Jr., 18, of Alabama, permits survival of animals on another planet. John M. Crowell, 17, also from Alabama, exhibited his telemetering system for an earth satellite, while a comparison of three methods of astrophotography on the moon was shown by Harry Crawford, Jr., 16, of Texas.

William P. Cargile, 18, of Alabama exhibited a digital method of unscrambling codes, and a computer designed to translate English, Latin and Russian was demonstrated by Anthony J. Perrella, 17, of Wyoming.

An 18-year-old from Michigan, Philip C. Bockman, explained an improved prosthetic tendon he devised from stainless steel and plastic sponge. Another 18-year-old, David H. Chen, from Maryland, told about his extensive work with the juvenile hormones that may prove so important in prolonging vigorous life.

Several finalists have been investigating experimental methods of protecting against and treating exposure to radiation. The use of sound waves as anesthesia has been studied by James L. Snyder, 17, of Indiana. The production and uses of thermoelectricity, and the development of a new silicone material, two other examples of interesting projects, were presented by David C. Adams, 18, of South Carolina and David C. Hill of Michigan.

A high school senior from Minnesota, Willis B. Hammond, Jr., said that the foul smell of the juice from pea vines he stacked one summer inspired him to do a chromatographic analysis of the liquid.

These, of course, are just a sample of the hundreds of projects seen by thousands of visitors to the Fair. Science clubs and classes, entire schools, educators, scientists, writers, photographers, and the general public enjoyed this preview of tomorrow and its scientists.

The National Science Fair-International is an activity of SCIENCE SERVICE of Washington, D. C. Arrangements for the Fair at Indianapolis were made by a local committee under the chairmanship of Dr. Karl Kaufman, dean of the College of Pharmacy at Butler University.

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Science Fairs Commended

COMMENDING the effectiveness of science fairs and clubs, Dr. T. Keith Glennan, administrator of the National Aeronautics and Space Administration, issued the following statement in connection with the 11th National Science Fair-International.

METEOROLOGY

Ice Nuclei From Ocean

WIDESPREAD RAINFALL often results when large amounts of sub-microscopic particles called ice nuclei are present in the air, Dwight B. Kline of the U. S. Weather Bureau has discovered.

He said one of the major mysteries in cloud physics is the origin of ice nuclei. The most common explanation is that they come from soil dust or volcanic ash dust. Both have siliceous material which is active as ice nuclei.

However, Mr. Kline said that his information points to another possible source: the ocean. A series of ice nuclei measurements over a year and a half in the Washington, D. C., area showed a close connection between large amounts of ice nuclei and air masses that moved in from the ocean.

Laboratory tests confirmed that bubbling action at the surface of the ocean water could release an abundance of ice nuclei into the atmosphere.

SOCIOLOGY

Underprivileged Teens

A SURVEY of teen-agers living in an underprivileged neighborhood shows the young people hold values only slightly different from children in a more privileged community.

Dr. Catherine Urell, a research associate with the Bureau of Educational Research of the Board of Education in New York, reports the underprivileged teen-agers seek a life as average, respected citizens with a steady income.

The survey found the low-income teenagers most wanted to be "good," "obedient" and "respected" citizens. Their second highest ideal was to be kind and understanding and helpful to others.

Seventeen percent of the underprivileged wanted a professional career. Forty-five percent of the more privileged children had a professional goal.

"Science clubs and science fairs are an essential part of the nationwide effort to upgrade the study and understanding of all the sciences and their important role in this space era."

"Through these activities students of all ages are given a unique opportunity to become personally involved in the challenge and reward of the sciences and future careers in these disciplines."

"The leadership of Science Service, through its science youth program, merits particular mention. This program has made it possible for hundreds of national and local organizations to give valuable support to developing a new generation of American scientists, engineers, technologists, and well-informed citizens."

The National Science Fair-International, which is conducted annually by Science Service as an activity of its science youth program, was held this year in Indianapolis, May 11-14.

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He explained that ice nuclei have the property of converting sub-cooled cloud droplets into ice crystals. Ice crystals grow at the expense of surrounding water droplets in clouds. As they grow, rain is released.

The siliceous material in the ice nuclei could come from sea salt, to which it might be attached, or be suspended in the sea water as well as from land sources.

Mr. Kline said also that on Jan. 15, 1960, high concentrations of ice nuclei were found in five locations at the same time. This suggests the possibility that there may be other sources of ice nuclei than those earlier advanced.

For the study, ice nuclei were "grown" in cloud chambers in a super-cooled sugar solution until they reached visible size. Mr. Kline was in charge of the instrumentation for the study.

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The underprivileged children said they wanted respectability twice as often as a test group from a better neighborhood. Dr. Urell believes children from higher income families probably take respectability for granted.

A large number of the underprivileged named entertainers as their ideals of successful persons, but more than three times as many named parents, teachers, adult relatives and community leaders. Fewer teen from the privileged group named family members as ideals. More named teachers.

Thus, Dr. Urell concludes in the Teachers College Record, a professional journal of Columbia University's Teachers College, that the attitudes of the underprivileged children represent the values and goals of most ethical societies.

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GENERAL SCIENCE

Awards Given at Fairs

TWO HIGH SCHOOL BOYS—one from West Hartford, Conn., and the other from Lafayette, Ind.—each won three top awards from the Army, Navy and Air Force at the National Science Fair-International in Indianapolis, Ind.

The three services independently picked James K. Bramblett, 17, of Jefferson High School, Lafayette, and Donald F. Carpenter, 16, of William Hall High School, West Hartford.

Bramblett's three awards were for an exhibition of an ultraviolet flying spot microscope. Carpenter's were for an exhibit on aerodynamics and thermodynamics of a counterflow vortex tube.

The Navy's award includes a cruise and a gift of binoculars to the two boys and these other top winners: Harry C. Brown Jr., 16, of Clinton, Miss.; Roman S. Ohnemus, 17, of Tallahassee, Fla.; Duval S. Bell, 16, of Albuquerque, N. M.; John M. Cone Jr., 16, of Anniston, Ala.; and Carlos Ramirez, 15, of Mayaguez, P. R.

The Army awarded trips to rocket facilities at Huntsville, Ala., to Bramblett and Carpenter.

The Army also awarded trips to various bases and laboratories to Joe E. Candy Jr., 17, of Alva, Okla.; Philip C. Bockman, 18, of Grand Rapids, Mich.; Donald C. Shapero,

18, of Palo Alto, Calif.; Michael L. Lowe, 16, of Dickinson, Tex.; Marvin K. Hutt, 16, of New York, and John M. Cone Jr., who had also won the Navy award.

The U. S. Air Force and Air Force Association awards went to Bramblett and Carpenter and to Gerald G. Birdwell, 18, of Eagle Lake, Tex.; Larry R. Owen, 18, of Nixa, Mo.; and Barbara Jane Dymond, 16, of Fleetville, Pa., the only girl among the top military winners.

Several other major awards were presented to some of the 356 finalists from all over the United States and from several other countries. The American Medical Association presented its top awards to Brenda W. Lisle, 16, of Chattanooga, Tenn., and to Philip C. Bockman, 18, of Grand Rapids, Mich.

The American Dental Association made its top awards to Sheila M. Most, 15, of Gulfport, Fla., and Donald F. Kearney, 17, of Warwick, R. I.

The American Veterinary Medical Association gave its top award to Robert D. Towe, 17, of Bozeman, Mont., and the American Pharmaceutical Association's top award went to Eugene L. Diveglia Jr., 17, of Harrisburg, Pa.

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The chemists have perhaps the most exciting challenge at the moment. Theirs will be the task of learning practical ways of assembling the basic elements into desired compounds at will. For example, what I refer to as the COHN project visualizes synthesizing the elements of carbon, oxygen, hydrogen, and nitrogen into materials of our daily needs. Virtually all of our food, fuel, and even much of our clothing and shelter are made up of these four elements. They are in unlimited abundance over the earth. Nature makes them into our food, fuel, and materials for us, but scientists of the future will learn how to do it readily and there will be no shortage of our basic living requirements. You who are interested in biochemistry may be the ones who will unlock this great secret of nature.

Naturally, man's desire for freedom from disease, swift repair from injury, a longer life span, better and more abundant foods, and greater and more effective use of his brain power, will occupy the biologists and life scientists for generations to come.

As I mentioned earlier, man's environment has always been a principal subject for the quest of new scientific knowledge. The recent International Geophysical Year gave a strong push to the door through which man has studied the earth and outer space. We are on the threshold of a vast new world into which the students of the earth sciences, biology, and astronomy can select at random new challenges of great importance to man's knowledge.

During the period you have been in high school the field of meteorology has advanced more than in all past history. The relationships of the upper atmosphere to the portion we live in is still to be worked out. The new weather satellites of your generation will develop world-wide forecasting far more accurate than we have enjoyed to date.

Oceanography efforts in this country are about to be increased and many young scientists will find a part in exploring the earth submerged in an environment of water rather than air. The resources of the seas, both biological and mineral, will add grossly to man's material wealth. Mining on the ocean bottom for rare minerals will soon be in man's grasp.

Geology is still a young science and requires fundamental advances to untangle the earth's long history. Some of you may make these great discoveries. The quest to drill deep into the earth to answer riddles about the nature of the core of the earth will be an achievement of your generation. The seismologists must delve even deeper than the Moho drill hole.

The ionosphere physicists have their work cut out for a generation or two ahead to link the relationships of the sun to our earth and outer atmosphere. The magneticians, cosmic ray specialists, auroral and meteor students have riddles to solve that require your help. The biologists have the challenge of discovering the secrets of life for they are far from being solved.

The astronomers have so vast a field that their exploration may never end, but the environment closer to us is not even near exhaustion of man's quest for understanding.

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GENERAL SCIENCE

Man Seeks Improvement

The demand for better instruments, ceramics, fuel and more efficient communication means a continued need for scientists. Physics, chemistry and mathematics are vital.

By DR. PAUL A. SIPPLE

Explorer and U. S. Army Research Office Adviser

Excerpts from an address given at the awards banquet of the National Science Fair-International in Indianapolis, May 13.

MAN IS DESIROUS of improving his mobility. He wants to transfer his location faster over the ground, through water, and in the air, and also safer, cheaper, and more comfortably. To accomplish this there is a continual desire for stronger, lighter, and more heat-resistant metals and ceramics. Chemists will be urged to find better fuels, lubricants, and batteries. There will be need for better instruments to aid and control navigation and guidance. Medical doctors, physiologists, and psychologists will be called upon to improve the human engineering of the vehicles and the health of the travelers moving swiftly from one environment to another. Scientists and engineers, inclined toward community planning, road building, and airport construction, will find continuing challenges as will the inventors and design engineers, working on the new transportation devices.

Equally important to man's desire for

mobility is his requirement for swifter and more reliable communications. He will not be satisfied until he has available a lightweight device to be carried on his person which permits audible and visual communication with anyone he desires no matter if they are located on the opposite side of the world or high above it in space. The scientists of tomorrow will find a demand for their services—solid-state physicists, improving transistors, or the electronics specialists improving thermionics and ion and electron controls. The goals are clearly defined for communications—lighter, smaller, greater range, lower power, simplicity, and abundance.

Despite the increasing availability of power and energy, there will be a continual increasing desire for more. There is challenge aplenty for scientists to develop new and better ways of transferring energy states. That is, reducing the high atomic energies downward and the lower abundant solar and internal earth energies upward to more easily usable levels.

The continuing demand for mathematicians and computer specialists to work out the problems posed by scientists in every field will not soon abate.

MEDICINE

Husband Responsible for 35% of Childlessness

CONTRARY to popular opinion, the fact that a couple is unable to have children is not always the "woman's fault." Involuntary childlessness affects 10% of American couples and the husband is the responsible agent in about 35% of these cases.

The need to pay more attention to the sub-fertile husband was emphasized at a meeting of the American Society for the Study of Sterility in Cincinnati, Ohio, by Dr. Paul L. Getzoff of the Touro Infirmary, New Orleans, who said that the term "sterile male" is used too loosely.

In many cases, he pointed out, a man may be diagnosed as sterile solely on the basis of a semen analysis that shows a low sperm count. Physicians may have a wrong idea of how many sperm need be present for conception, Dr. Getzoff believes. A qualified urologist should be called upon to help diagnose the cause of sub-fertility, he said.

To substantiate his statements, Dr. Getzoff presented a five-year follow-up study of 100 men presumed to be sterile because of low sperm counts. In subsequent examinations, however, all but seven produced adequate sperm specimens. In the group as a whole, 67 of their wives later became pregnant at least once. Wives of all seven of the "infertile" men were among those who conceived.

Another aspect of the problem of inadequate sperm count was presented by Drs. Edmond J. Farris and Douglas P. Murphy of the Wistar Institute of Anatomy and Biology in Philadelphia. They described a technique for concentrating the husband's active sperm and then using this portion for intra-uterine insemination of the wife.

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ASTRONOMY

Next High in Sunspot Activity Due in 1968

THE NEXT PEAK in the sun's 11-year cycle of sunspot activity, expected in 1968, will not be as high as that reached in 1958.

Calculations reported in London by Dr. C. M. Minnis of the Radio Research Station, Slough, Bucks, show that conditions for world-wide communications during the 1964-1974 solar cycle will be roughly like those during the 1934 through 1944 and the 1944 through 1954 solar cycles. The chances are only one in three that the 1968 peak will be higher than the 1958 one, he has found.

The 1958 high, which occurred during the International Geophysical Year, hit a record not previously exceeded since accurate observations of sunspot activity started more than 200 years ago. Solar activity rises and falls in an 11-year cycle, reaching a peak quite soon after the beginning of a cycle, then gradually dropping to its low.

The possibility that the next cycle might reach a maximum higher than that in 1958 is of more than academic or scientific in-

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terest, Dr. Minnis reports in *Nature*, 186:462, 1960. Solar activity affects the ionosphere, the earth's radio reflecting roof, which is the basis for a world-wide network of short-wave radio communications.

A solar cycle that reached only a low peak, instead of a high one, might lead to unforeseen difficulties in long-distance communications because the radio spectrum is already crowded.

Although it is now impossible to make an accurate estimate, Dr. Minnis determined the statistical possibilities of a high peak. By two differing methods he found that the smoothed sunspot number during the next solar cycle will fall between 110 and 160. The high reached during 1958 was slightly more than 200. The two previous peaks were between 110 and 160.

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BACTERIOLOGY

New Data on Radiation And Body Defenses

INFORMATION on how radiation interferes with the body's defense against invaders is reported from the University of California, Los Angeles.

Bacteriologists Marvin B. Rittenberg and Dr. Eric L. Nelson have evidence that radiation may scramble coding of nucleic acid, which contains blueprints for proteins such as antibodies. Thus antibodies designed to destroy a specific foreign substance are not formed.

They irradiated experimental animals, then immunized them with bovine albumin. In normal animals injection of the bovine albumin resulted in rapid production of antibodies to the albumin, but in irradiated animals there was no evidence of antibodies being produced.

However, there was evidence that in the irradiated animals the injection stimulated the production of antibody-like protein, globulin.

The investigators suggested that radiation does not interfere with the mechanism that manufactures antibody proteins, as had been thought. Instead it may scramble the coding system of the nucleic acid which blueprints the antibody.

Thus the antibody protein is nonspecific in that it is not designed to defend against a specific invader.

The study was supported by the U.S. Public Health Service.

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MINING

Coal Mining With Water Shown Feasible in Tests

EXPERIMENTS have shown bituminous coal can be mined with water. The system uses water at a pressure of 4,000 pounds per square inch, a pump run by a 900-horsepower diesel engine and extremely heavy carbon-steel piping. Nozzles used in the tests ranged from one-eighth to one-half inch. The tests were made in Indiana County, Pa., and reported to the 1960 Coal Convention of the American Mining Congress in Pittsburgh, Pa.

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ICHTHYOLOGY

Fish in Shallow Lakes Helped by Ice Skating

USING A SHALLOW lake for ice skating may save fish from suffocation, C. W. Threinen, administrative assistant for the Wisconsin Conservation Department, reported.

Mr. Threinen said that in order to ice skate, it is first necessary to remove the snow cover. He said snow removal permits light to filter through the ice; this in turn lets plants under the ice continue to work and give off oxygen.

If the shallow lakes remain covered with snow they become short of oxygen, Mr. Threinen said, and the fish may suffocate. But turning such lakes into skating rinks can make the skaters happy and increase the chance of survival for fish.

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PUBLIC SAFETY

Some Detergents Remove Radiation Contamination

SPECIAL DETERGENT compounds are being used by the United Kingdom Atomic Energy Authority, London, to remove contamination by radioactive metals and their salts.

One of these detergents is reported to have reached a high degree of perfection and can deal successfully with radioactive contamination even when it has become chemically bound to working surfaces or to clothing. Its composition has been chosen to prevent re-adsorption of the contaminant during dilution and rinsing, such as can occur with acid decontamination.

This detergent compound comes in various forms. One of the easiest to handle is a cream, made by adding a thickening agent such as sodium alginate to the detergent solution. This may be applied to aircraft by brushing, the coating kept moist by light spraying and then removed with hot water or wet steam. Where contamination has penetrated into the surfaces to be treated, the compound can include an abrasive such as powdered pumice.

The detergent provides mild conditions of acidity that allow practically any material to be treated, being especially suitable for textiles (including wool), plastics, paint, rubber and metals.

In one test, aluminum and stainless steel surfaces contaminated with a plutonium salt solution and with a cerium-144 salt solution were exposed to the detergent for 15 minutes at room temperature. At the end of the test, plutonium contamination on the aluminum had been reduced to 0.5%, and on the stainless steel to 0.8%, while cerium-144 on the aluminum had dropped to 0.2%, and on the stainless steel to 3.2%.

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THE FIELDS

PHARMACOLOGY

Recommend Numorphan As Childbirth Aid

NUMORPHAN, a new synthetic derivative of morphine, is more effective and safer for use during childbirth than other analgesics, or pain killers, such as meperidine, according to a report at the Pan American Medical Association meeting in Mexico City.

Drs. Donald L. Snow and Edward Sattenspiel, of the Maricopa County General Hospital, Phoenix, Ariz., presented a paper showing that a high percentage of patients obtained marked relief from pain and discomfort faster than possible with other drugs. Shortened labor and an almost negligible depressing effect on infants are notable advantages.

Previous studies showed a close relationship between infant suffocation at birth and later defects in children caused by analgesic drugs requiring strong doses. Numorphan, discovered and produced by Endo Laboratories of Richmond Hill, N. Y., was given to 349 patients in labor during the study, which was undertaken on all obstetric patients admitted to the Maricopa Hospital from Oct. 1, 1959, to April 15, 1960. Ages of the women ranged from 13 to 42.

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SEISMOLOGY

Microtremors Could Influence Building

MEASUREMENT of microtremors of the earth at 250 places in six western states may provide new information on building in earthquake regions of the world.

The measurements will be made by Dr. Kiyoshi Kanai, engineering seismologist at Tokyo University's Earthquake Research Institute and currently visiting lecturer at the University of California, Los Angeles. Microtremors are the continuous but barely detectable earth motions caused by traffic, heavy construction, and industrial machines.

A major purpose of his research, supported in part by the U. S. Coast and Geodetic Survey, is to study American earthquake data and compare it with earlier Japanese research.

Dr. Kanai's measuring instrument will be a unique portable seismograph, developed by him during a ten-year period, and especially designed to easily record and analyze microtremors.

His joint research with associate dean C. Martin Duke of the UCLA College of Engineering could have far-reaching effects for city planners and the California construction industry.

Analysis of microtremors gives a clue to the motion that might be expected in a real earthquake. On the whole, the degree of

destruction depends on the relation between soil conditions and the type and quality of structures, with buildings on hard ground generally having a better chance of survival than those on soft soil.

Many quake-prone countries take these soil differences into account in their building codes. In Tokyo, for instance, ground conditions are pin-pointed block by block.

If this system were adopted by American cities, Dr. Kanai believes, it would not only increase the safety factor but help cut construction costs for buildings resting on relatively safe ground.

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AGRICULTURE

Early-Cut Silage Feed Increases Cows' Milk

DAIRYMEN can save millions each year by feeding their cattle early-cut silage instead of late-cut field-cured hay, two researchers reported. New York State alone should save more than \$50,000,000 by using this kind of feed.

Profs. S. T. Slack and Keith Kennedy of the New York State College of Agriculture at Cornell University found in three years of experiments that cows produce an average of 16 pounds more milk a day if fed the early-cut silage diet.

Their experiments were carried out on purebred Holstein and Brown Swiss cows. Cows fed the early-cut silage gave slightly more than 50 pounds of milk a day. Those fed early-cut barn-dried hay produced 44 pounds and those on the late-cut field-cured hay diet produced less than 35 pounds daily.

Agricultural specialists are not sure why the early-cut feed gives better results. However, they believe that the acids formed in the silage as it develops may aid the cow's digestive processes and enable it to produce more milk. The acids in the silage are similar to those in a cow's digestive tract.

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ZOOLOGY

Southeast Asia Swiftlets Find Location as Bats Do

THE SWIFLETTS, birds of southeast Asia, find their locations in the same manner as bats do—by sending out sound waves, then listening for the answering echo.

Lord Medway of the University of Birmingham, England, reported discovering this method of location by swiftlets after he had tested them experimentally in a dark room under controlled conditions.

It has long been known that these birds are able to fly in total darkness in the caves in which they nest. When approaching the opening of a cave from the outside in darkness, however, they have now been found to utter a rattle type of sound. Frequency of the sound varies from one to five kilocycles per second—within range of human hearing—it is reported in the *Journal of the Acoustical Society of America*, 32:518, 1960.

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MEDICINE

Dope Addicts Fool Unsuspecting Doctors

DRUG ADDICTS can fool an unsuspecting doctor and get him into legal trouble before the doctor knows he is even dealing with an addict.

LeRoy W. Morrison of the U. S. Bureau of Narcotics in Washington, D. C., said addicts are experts at describing and imitating any ailment requiring narcotic drugs to kill pain. As a rule, addicts use kidney or gall-bladder ailments as their first approach, he said.

In describing the devious ways in which addicts obtain drugs, Mr. Morrison reported in the *Medical Annals of the District of Columbia*, 29:234, 1960, that a doctor can often distinguish the addict from the patient who really needs narcotics if he knows what to look for.

The average addict has a sallow or ashen complexion, needle marks over veins of the hands and arms. He often wears long sleeves to cover these marks. The pupils of the eyes are pinpoint size when there is no immediate need of narcotics, and dilated when the effect wears off or when the addict is using synthetics or cocaine.

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GENERAL SCIENCE

Arts and Sciences Olympiad Proposed

A NATIONAL SHOWCASE and an International Olympiad have been proposed in Congress to encourage and recognize youthful ability in the sciences and in four categories of the arts.

The national program would recognize and present to the public the work of outstanding young American scientists and artists. International exhibitions, productions, festivals and programs in these fields are envisioned as strengthening mutual understanding, offering opportunities for young people to win distinction, and enriching the world through the exchange of ideas.

These goals were outlined by Rep. Harris B. McDowell Jr. (D.-Del.), who introduced legislation with Rep. Frank Thompson (D.-N. J.) setting up the National Showcase-International Olympiad (H.R. 9503 and H.R. 9467). Similar bills were sponsored in the House by Rep. Carl Elliott (D.-Ala.) and Rep. Edith Green (D.-Ore.), and in the Senate by Sen. Wayne Morse (D.-Ore.), (S. 3256).

In the field of the sciences, Rep. McDowell has suggested that the patterns established in the Science Talent Search and the National Science Fair-International conducted by SCIENCE SERVICE might be followed, with a group of distinguished international scientists deciding the specific type of competition to be held.

In the arts, Rep. McDowell proposed including a folk festival of dances, songs and handicrafts, a festival of classic and original drama and classic dance forms, a music festival involving individual competition of performers on all principal instruments, and a competition in painting and sculpture.

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ENTOMOLOGY

U.S. Fights the Fire Ant

The imported fire ant, native to South America, has become a major insect pest in many southern states. Efforts are being made to check its spread and eliminate it entirely.

ABOUT THE END of World War I an enemy agent entered this country undetected, having stowed away on some South American freighter and jumped ship in Mobile, Ala.

He devoted his first years here to familiarizing himself with his new environment—so his subversive activities started slowly. But by 1940 his influence had spread over large areas of southern Alabama and Mississippi and eastern Florida. By 1957 his sabotage was causing millions of dollars of damage over a ten-state area. And he is still on the loose.

Who is this dangerous agent? How has he managed to operate for so long? What is being done to stop him?

He is the imported fire ant—a modest quarter inch of insect ferocity. Anyone who has felt this ant's sting will agree that it is aptly named; it is called "imported" to distinguish it from its less obnoxious domestic cousins—the three fire ants native to the United States.

Solenopsis saevissima richteri Forel, as it is known to scientists, presents one of the toughest pint-sized triple threats in the insect world. It is omnivorous—meaning it eats anything—and destroys many forms of plant life and young animal life. It builds large mounds that become so hard they interfere with crop production. And it stings painfully, sometimes causing serious illness and even death.

All this adds up to an estimated cost to farmers and homeowners in Alabama alone, the most seriously affected state, of \$25,000,000. The ant is also an established pest in Arkansas, Mississippi, Louisiana, Florida, Georgia, North and South Carolina, and Texas.

Eradication Harms Wildlife

Yet controversy reigns over the wisdom of eradicating the fire ant. There are many conservationists who feel that the powerful insecticides needed to kill off the ant may do more harm to other insects and wildlife than eradication of the fire ant is really worth.

Be that as it may, the fire ant remains feared and detested by those who have suffered at its hand, and control measures to the tune of at least \$10,000,000 are in force.

Principal habitat of the imported fire ant is open land—cultivated fields, pastures, wastelands and recreation areas. It spreads from area to area via the natural mating flight of the winged queen ants and, over longer distances, by being carried in cars, trucks, planes, boats and even on logs and debris floating in streams.

The ant damages vegetable crops by sucking juices from the stems and by gnawing

holes in roots, stalks, buds, ears and pods. It injures pasture grasses, cereal and forage crops, nursery stock and fruit trees. Primarily an out-of-doors insect, it will also invade houses, where its favorite foods are meats, butter, cheese, nuts and bread.

Fire ants often extend their attacks to young, unprotected animals, such as newborn calves and pigs and newly hatched quail and poultry. Often they chase brooding hens off their nests and eat their chicks.

The high, hard-surfaced mounds of the imported fire ant, sometimes numbering up to 100 per acre, make it difficult or impossible to use certain mechanical equipment, tending to break or damage the blades of harvesting machinery. Usually 10 to 18 inches in height and 15 inches in diameter, the mounds are particularly troublesome in hayfields.

If a person disturbs a fire ant mound, thousands of ants launch an immediate attack. Because each ant may sting three or four times, as many as 3,000 to 5,000 stings may be administered in seconds.

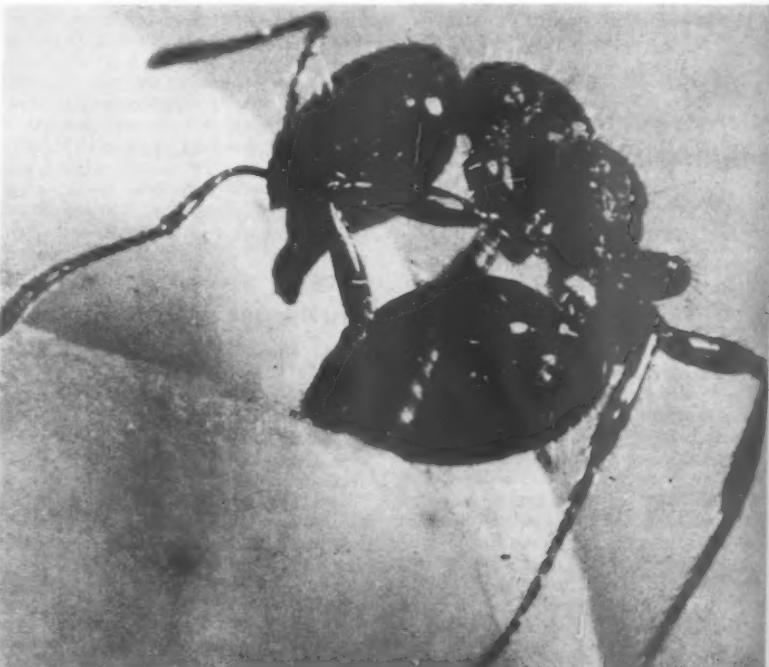
When it reaches the skin, an ant grips it with its mandibles, pulling and raising it slightly. It then arches its back and inserts its stinger. The ant may remove the stinger and reinsert it at different sites, all the while maintaining its mandibular grip on the skin.

The sting of the fire ant brings a brief stabbing pain, comparable to the sting of a honeybee, and the area begins to itch and burn. Afterwards a pimple-like sore forms that often leaves a scar. People who are unusually sensitive to fire ant venom may suffer chest pains and nausea when bitten and may even lapse into a coma, and may die.

Three Forms of Fire Ants

There are three adult forms of imported fire ants—winged fertile females (queens), which lay eggs; winged fertile males, which mate with queens, and the worker ants, which are wingless females and usually sterile.

Most ants in a well-developed nest are wingless workers and are of about the same color. However, their color may vary, from colony to colony, from dark brown to reddish black. The workers may also vary markedly in size, from one-eighth to one-quarter inch long.



FIRE ANT STINGS—An imported fire ant is seen here on a person's finger in the position of stinging. Gripping a piece of skin with its mandibles, it arches its back and inserts its stinger—located in the abdomen—into the skin. Each ant may sting three or four times while clutching the same piece of skin. The bite brings a brief stabbing pain comparable to the sting of a honeybee.

Winged queens and winged males are rarely seen outside the mound, for they live inside until time to leave the mound for their mating flight. After mating, the fertilized queen finds a nesting site, sheds her wings, and digs a brood chamber one to four inches underground.

She lays her first cluster of eggs—10 to 15—usually the day after mating. The winged male, meanwhile, has become homeless and dies within a few days. By the time the first cluster of eggs hatches into larvae (in eight to 12 days), the queen has laid a hundred or more eggs.

The queen cares for the first brood, but workers feed later broods. The larval stage of the workers is six to 12 days. The larvae, helpless dirty-white grubs, then change to pupae that are pale, shiny white, and about the same size and shape as the adults. They gradually darken and adult workers emerge in nine to 12 days.

Workers care for the brood, forage for food, maintain and enlarge the colony and protect the nest from enemies. A mound is formed when workers from the queen's first brood enlarge the underground quarters. Workers of later broods help build a firm mound that is honeycombed with underground passages.

In 1957, Congress enacted legislation setting up a joint Federal-state imported fire ant eradication program. It authorizes the U.S. Department of Agriculture to help interested states, local governments and property owners fight the fire ant on more than 20,000,000 acres. The cost of this program is being shared by all parties involved.

Three coordinated steps are underway—surveys to find infested areas, treatment of infested areas with insecticides, and quarantines to prevent spread of the ant into uninfested areas.

The insecticide phase of the program is to rid infested areas of the ant and to keep these areas free of it. USDA claims every precaution is taken to apply insecticides in such a way that they will not harm people or animals. They are applied only where an immediate need exists and not on an area-wide basis.

A Federal quarantine restricts or prohibits the interstate transportation of the ant and regulates the interstate transportation of articles that may be carriers of the ant in Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, South Carolina and Texas. Similar state regulations control transportation of the fire ant and regulated articles from infested to uninfested locations in these states.

The Agricultural Research Service of USDA says individuals can help in controlling the imported fire ant by:

1. Reporting infestations suspected to be imported fire ants to the county agent or state entomologist.
2. Participating in community action designed to wipe out the fire ant.
3. Giving survey and eradication workers free access to property.
4. Following all precautions recommended when insecticides are applied.
5. Treating fire ant mounds in advance of the coordinated program.

BIOLOGY

Animals Ape Each Other

HOW ANIMALS of different species mimic each other in their struggle for survival is being studied at Amherst College, Amherst, Mass., by Dr. Lincoln P. Brower.

Working under a grant from the National Science Foundation, Dr. Brower has furnished a converted greenhouse laboratory with eight bird cages and other equipment to conduct experiments to determine how, by imitating or resembling one species, individuals of another species increase their chances of survival.

Using evening grosbeaks and jays, for instance, he is trying to find some of the conditions that cause a bird to reject a palatable insect that resembles an unpalatable one. Flies that resemble noxious wasps, or butterflies that resemble distasteful butterflies of other species are called mimics. By their resemblance to dangerous or unpalatable species, the mimics tend to escape being eaten by predators such as birds.

VETERINARY MEDICINE

Farmers Not Veterinarians

FARMERS ARE WARNED against do-it-yourself treatment of animals in an editorial in the *Journal of the American Veterinary Medical Association*, 136:458, 1960.

The editorial blames pharmaceutical advertising for leading dairymen to attempt vein puncture and other techniques requiring veterinarian training.

The journal reports that indiscreet medication of animals headed for immediate slaughter will result in consumers eating unsafe and adulterated foods made impure

Under laws of natural selection, mimicry is gradually perfected, with the better mimics of each generation tending to be those that survive to produce the next generation.

Dr. Brower is feeding his birds insects brought to varying degrees of unpalatability.

"In mimicry theory," he said, "the more distasteful a model is, the greater the number of mimics that will escape being eaten by predators."

To investigate this, one of Dr. Brower's assistants is feeding blue jays beetle larvae dipped in various concentrations of quinine. The concentrations are not dangerous, merely distasteful, to the birds. A definite correlation is being found between the degree of distastefulness of the artificial model and the number of artificial mimics, which taste good, rejected by the birds.

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by drug residues in the flesh. Surveys by the Food and Drug Administration since 1957 have proved this danger.

For example, dangerous residues of penicillin found in milk were considered largely due to improper use of mastitis infusion preparations or failure to follow instructions on packaged products requiring that milk from treated cows be withheld from the market for 72 hours.

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PUBLIC HEALTH

Exhaust-Purification Tried

TWO ATTEMPTS at controlling and eliminating noxious, smog-producing exhaust fumes given off by motor vehicles have won patents.

One is an aluminum filtering attachment that fits on the end of an automobile's exhaust pipe. The other is a method of feeding into the exhaust pipe chemicals that will react with the gases and render them less objectionable.

The filter attachment, invented by Jose L. Villasenor and Raul H. Leon of San Diego, Calif., consists of four connected chambers. One circulates air taken in by the rapid forward motion of the car. A second chamber mixes this air with the gases coming from the exhaust pipe. In a third chamber the noxious fumes are absorbed and reduced by mixing with castor oil. The last chamber provides final purification and cleansing.

This purification attachment is claimed to be easily attached and removed, simply manufactured, effective and durable. The inventors received patent No. 2,932,157 and assigned one-third of the patent rights to

James B. Abbey, also of San Diego.

The method of mixing chemicals with the ejected fumes was invented by Frederick C. Binter of Moorestown, N. J. It is claimed to purify the exhaust from both diesel and gasoline internal combustion engines, and to drastically reduce objectionable odors and irritating substances.

Mr. Binter accomplishes this by injecting into the exhaust pipe, preferably as far from the outlet end as possible, chemical derivatives of ammonium salts, which may be either liquids or solids that are water soluble. If a continuous flow of such chemicals is intimately mixed with the exhaust fumes as both pass through the pipe, he says, they remove or convert the noxious substances in the exhaust gas and result in a product that is neither foul-smelling nor irritating to the eyes.

The chemicals added to the pipe may be held in a refillable container mounted at the rear of the vehicle and fed to the exhaust pipe by direct pipes. The invention earned patent No. 2,932,364.

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Books of the Week

For the editorial information of our readers, books received for review are listed. For convenience purchase of any U. S. Book in print, priced at 95¢ or over, send a remittance to cover retail price (postage will be paid) to Book Department, Science Service, 1719 N Street, N.W., Washington 6, D.C. Request free publications direct from publisher, not from Science Service.

ANXIETY IN ELEMENTARY SCHOOL CHILDREN: A Report of Research—Seymour B. Sarasan and others—*Wiley*, 351 p., \$7.75. Reports on six-year study at Yale of the effect of anxiety on the test performance of children.

THE BIOLOGY OF MARINE ANIMALS: J. A. Colin Nicol—*Interscience*, 707 p., illus., \$14. Deals with major physiological activities, such as water-balance, respiration and luminescence, of different animals on a comparative basis.

BRITAIN'S SCIENTIFIC AND TECHNOLOGICAL MANPOWER: George Louis Payne—*Stanford Univ. Press*, 466 p., \$8.50. Survey of postwar developments in Britain with projections of future needs, prepared for the President's Committee on Scientists and Engineers.

CHEMISTRY FOR ENGINEERS: An Introductory Course—Edward Cartmell—*Butterworths (Canada)*, 172 p., illus., \$5. Intended as background study for all branches of engineering.

COMPARATIVE BIOCHEMISTRY: A Comprehensive Treatise, Vol. II: Free Energy and Biological Function—Marcel Florkin and Howard S. Mason, Eds.—*Academic*, 685 p., \$20. Critical summary of present knowledge in the field.

CREATURES OF THE NIGHT: Dorothy Sterling—*Doubleday*, 125 p., illus. by Winifred Lubell, \$2.95. Introduces children to the habits of beetles, moths and crickets.

DIRECT CONVERSION OF HEAT TO ELECTRICITY—Joseph Kaye and John A. Welsh, Eds.—*Wiley*, unpage, illus., \$8.75. Collection of papers discussing thermionic engines, magnetohydrodynamic converters, semiconductor devices and fuel cells.

EBB AND FLOW: The Tides of Earth, Air, and Water—Albert Defant—*Univ. of Mich.*

Press, 121 p., illus., paper, \$1.95. Describes what tides are, how they work, and why.

ELECTROMAGNETIC WAVES: Robert Irving-Knopf, 144 p., illus. by L. E. Fisher, \$3. Young scientist's introduction to visible and invisible rays.

ELEMENTARY STATISTICS: Paul G. Hoel—*Wiley*, 261 p., \$5.50. One-semester course presenting fundamental ideas of statistical methods.

ELIZABETH GARRETT, M.D.: Jo Manton—*Abelard-Schuman*, 159 p., \$3. Juvenile biography.

ENGINEERING THERMODYNAMICS: An Introductory Textbook—James B. Jones and George A. Hawkins—*Wiley*, 744 p., \$8.50. Textbook for undergraduate engineering students.

HIGHWAY ACCIDENT STUDIES: R. C. Blensly and others—*Highway Res. Bd. Bull.*, 240, 56 p., paper, \$1. Contains five papers on accident analysis.

INCENTIVE: How the Conditions of Reinforcement Affect the Performance of Rats: Frank A. Logan—*Yale Univ. Press*, 288 p., \$6. Exploratory research on how behavior is affected by the way rewards are given.

INSTINCTIVE LIVING: A Study of Invertebrate Behaviour: Theodore Savory—*Pergamon*, 90 p., illus., \$3. Concerned with the interpretation of the actions of invertebrate animals in general and spiders in particular.

AN INTRODUCTION TO STATISTICAL THERMODYNAMICS: Terrell L. Hill—*Addison-Wesley*, 508 p., \$9.75—Text for courses in chemistry or physics on the advanced undergraduate graduate level.

MEDICAL FEE GUIDE: A Service of the Medical Reference Bureau—*Medical Fee Guide Publication*, 563 p., \$20. Lists fees for medical services, surgery, radiology and pathological examinations at Workmen's Compensation, Medicare and Blue Shield rates.

NATIONAL INTERESTS IN ANTARCTICA: An Annotated Bibliography—Robert D. Hayton—*U.S. Antarctic Projects Officer (GPO)*, 137 p., map, paper, \$1.25. Contains 1168 entries of official publications, books, pamphlets and articles from 27 nations.

THE NAVY BLUE BOOK, Vol. I—Tom Compere, Ed.—*Bobbs*, 374 p., illus., \$4.95. Handbook on modern developments in the U.S. Navy with list of Navy facts.

PALMS OF THE WORLD: James C. McCurrach, foreword by W. H. Hodge—*Harper*, 290 p.

400 photographs, \$17.50. Introduction and reference to the known genera of palms throughout the world, giving characteristics of individual species, their origin and cultivation.

THE PHARMACOPEIA OF THE UNITED STATES OF AMERICA (The United States Pharmacopeia) XVI—U.S. Pharmacopeial Convention, Committee of Revision—*Mack Pub. Co.*, 16th rev. ed., 1148 p., \$10. Official from October 1960, contains 908 monographs on drug standards, descriptions of general tests and reagents, and new admissions.

PLANET EARTH: Karl Stumpff—*Univ. of Mich. Press*, 191 p., illus., paper, \$1.95. Explains the earth's origin, movements, structure, size and shape, and its place among the stars.

POLYESTER RESINS: John R. Lawrence—*Reinhold*, 251 p., illus., \$5.75. Chemistry and applications of unsaturated polyester resins, widely employed in reinforced plastics.

THE POWERFUL CONSUMER: Psychological Studies of the American Economy—George Katona—*McGraw*, 276 p., \$6.50. Sets forth findings on consumer behavior and its relation to psychological factors, based on data obtained through quantitative research.

RADIO-CONTROL FOR MODEL BUILDERS: William Winter—*Rider*, 220 p., illus., paper, \$4.25. Instructions for the model hobbyist.

THE ROCKETS' RED GLARE: The Challenge of Outer Space: Mortimer W. Lawrence—*Coward-McCann*, 121 p., photographs, \$2.75. Shows young people why rockets work, and how we prepare for space flight.

SCIENTIFIC CAREERS IN THE AGRICULTURAL RESEARCH SERVICE: Agricultural Research Service—*GPO*, 37 p., illus., paper, 35¢. Description of objectives and accomplishments of the Service with information about career opportunities.

SHELLS ARE WHERE YOU FIND THEM: Elizabeth Clemons—*Knopf*, 87 p., illus. by Joe Gault, \$2.75. Easy-to-use book for the beginning shell collector.

SPECIAL FUNCTIONS: Earl D. Rainville—*Macmillan*, 365 p., \$11.75. Treats more than 50 special functions, for mathematicians, physicists, engineers and chemists.

THE SUN: Karl Kiepenheuer—*Univ. of Mich. Press*, 160 p., illus., paper, \$1.95. Emphasizes and illustrates the peculiarities of the sun for the general reader.

SYSTEMS PRELIMINARY DESIGN: Joseph J. Jerger—*Van Nostrand*, 625 p., \$14.75. Covers at length the various interrelationships that exist in the preliminary systems design of a guided missile, and shows how they may be integrated for a given performance specification.

T. H. HUXLEY: Scientist, Humanist and Educator—Cyril Bibby, forewords by Sir Julian Huxley and Aldous Huxley—*Horizon Press*, 330 p., illus., \$5. Story of Huxley's career mainly as an educator, based on original material.

WORD FINDER: Ruth I. Anderson, Lura Lynn Straub and E. Dana Gibson—*Prentice-Hall*, 244 p., \$1.80. Spelling, accent and syllabication reference.

YOU AND SCIENCE: Science for Better Living—Paul F. Brandwein and others—*Harcourt*, new ed., 702 p., illus., \$4.84. Juvenile general science course brought up to date.

Science News Letter, May 21, 1960

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TECHNOLOGY

"Caruso Principle" Tests Metal Pipe Durability

HOW MANY YEARS of service a metal pipe will give is now being determined by the "Caruso principle"—a quick, resonance bending test. The pipe is forced to shake itself until it literally "cracks up" in just a few minutes.

A ten-foot length of welding fittings or other pipe components is suspended by two cords and is filled with about 10 pounds of air pressure per square inch. An arrangement of weights, attached to the pipe and to an electric motor, induces a sympathetic vibration of the pipe at its natural resonance frequency. The pipe bends itself back and forth several thousand times a minute until it develops fatigue failure and a tiny crack appears.

Sympathetic vibration and fatigue-failure cracking are the same principles by which famed tenor Enrico Caruso, according to legend, shattered glasses by singing at them. According to the stories, Caruso could produce such a pure tone and could sustain it so long that a crystal goblet would vibrate sympathetically and finally crack or shatter.

In the case of the pipe tests, the crack allows the pressure to leak out and the pipe becomes akin to a flat tire. When the pressure drops, all the machinery stops and the timer shows how long it took to wear out the pipe section.

The tests were performed at the Chemtron Corporation, Louisville, Ky., and are believed the first of their kind in the United States. Pipes can now be tested in a few minutes, five or six times faster than by previous methods.

The new technique is "more economical from the standpoint of power requirements, manpower, equipment investment and maintenance." In the future it may be used for rapid testing of new metals and alloys as they are developed for nuclear and space travel piping requirements.

Science News Letter, May 21, 1960

HORTICULTURE

U.S. Participates In 1960 Floriade

THE UNITED STATES exhibition at the 1960 Floriade in the Netherlands represents the first participation by this country in a horticultural exposition abroad.

The Floriade, international gardening event of the year and often referred to as the Olympics of horticulture, opened March 25 in Rotterdam and will run through Sept. 25. Five million visitors are expected to attend the six-month show, in which nine nations will participate.

The history-making American exhibit is a product of joint cooperation between Government and private citizens. It is co-sponsored by the Foreign Agricultural Service of the U. S. Department of Agriculture and the American Horticultural Council.

The theme of America's three-and-a-half-acre display is how Americans really live, what kind of homes they have and what

kind of gardens they have. Emphasis is on middle-income living.

One of the most unusual displays is by the Atomic Energy Commission, demonstrating how peaceful atomic research contributes to knowledge of plant functions.

The United States Exhibit, which features redwood throughout, also includes a 5,000-square-foot fragrant garden of American-bred roses and a sizable display of ornamental plants by Harvard University's Arnold Arboretum. Educational and institutional displays by governmental and horticultural organizations are featured in a special pavilion.

Science News Letter, May 21, 1960

METEOROLOGY

Iowa Most Frequently Hit By Tornadoes Since 1916

IOWA was the state most frequently hit by tornadoes from 1916 to 1950, a U. S. Weather Bureau climatologist reported.

Lothar A. Joos of Champaign, Ill., said that current averages, however, placed Iowa behind Illinois, Missouri and Nebraska in tornado occurrence. He told the American Meteorological Society meeting in St. Louis that the recent sharp increase in tornado frequency resulted from better reporting of the occurrence of these severe local storms, not from a detectable increase in actual frequency.

Science News Letter, May 21, 1960

METEOROLOGY

Improved Predictions By Weather Moon System

SIX TO EIGHT weather satellites, all in orbit at the same time, would greatly improve the U.S. Weather Bureau's predictions, the Bureau's chief, Dr. Francis W. Reichelderfer, believes.

Dr. Reichelderfer reported that such a system of satellites could monitor remote polar areas and ocean areas from which storms may come. The satellite system would permit drawing more accurate world-wide weather maps. Dr. Reichelderfer said that meteorologists would relate satellite data with weather observed on the ground. Then they could predict the effect on the U.S. of a cloud formation over the ocean.

Dr. Harry Wexler, director of meteorological research at the Bureau, envisions five or six satellites on polar or near-polar orbits.

"One might be a noon satellite, one might be a 4 p.m. satellite, one might be an 8 p.m. satellite and so on," Dr. Wexler said. He also wants a satellite traveling west to east about the equator for detecting hurricanes.

This system of satellites, Dr. Wexler said, would keep track of each important storm around the world. Meteorologists would then know when these storms are about to strike.

Forecasts made in this manner would probably be made available to other nations through the World Meteorological Organization.

Science News Letter, May 21, 1960

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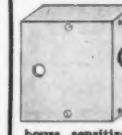
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TECHNOLOGY

Solar Cells Improved, Costs Continue to Fall

SILICON solar cells for converting light directly into electricity now have a conversion efficiency of 14%. When announced in 1954 by their inventors at the Bell Telephone Laboratories, the cells' efficiency was only six percent.

The American Power Conference in Chicago was told that with 100% efficiency, cells covering an area 300 miles long and 20 miles wide could produce enough electricity for the whole world. Dr. C. A. Escoffery of International Rectifier Corporation, El Segundo, Calif., said that solar cells already cost less per kilowatt hour than flashlight batteries, and costs will continue to fall.

"The main economic problem is now one of reducing the cost of storage-battery systems," Dr. Escoffery said. The battery systems are needed to store the electricity for use when needed.

Science News Letter, May 21, 1960

MEDICINE

Fungus Makes Better Guinea Pig Than Mice

A CERTAIN FUNGUS may turn out to be a better "guinea pig" than mice when it comes to screening products which might be cancer cures.

Commonly known as "water mold," the fungus has been used by two Michigan State University scientists to detect the presence of eight out of eight tumor inhibitors supplied by the National Institutes of Health.

Only six hours were needed for each trial, report Dr. Everett S. Beneke, professor of botany and plant pathology, and Dr. Yamuna Lingappa, research associate.

Using mice, it takes seven days to tell whether or not a substance has tumor-inhibiting properties.

The fungus method is now being tested further. N.I.H. sends unnamed substances to Michigan State. Dr. Lingappa must tell with the fungus assay which ones are tumor inhibitors.

If it proves effective, the technique could be used to screen the thousands of compounds sent to N.I.H. and pharmaceutical companies every year for testing.

The usual method is to test unknown substances on mice with tumors. In addition to taking seven days for results, this technique involves costs of raising and infecting large numbers of particular strains of mice.

The M.S.U. researchers simply treat their easily grown fungus with the trial substance. If it is a tumor inhibitor, it is expected to stop or slow spore formation by the fungus, *Achlya flagellata*. It is a cottony mold sometimes seen on fish and other water animals.

The reason the fungus makes a good test, Dr. Lingappa said, may be because its growth is similar in some respects to the wild rapid growth of a tumor.

The project is supported by a grant to M.S.U. from the American Cancer Society.

Science News Letter, May 21, 1960

ENGINEERING

Space Simulated To Test Antennas

See Front Cover

ANTENNAS placed in the anechoic room shown in the photograph on the cover of this week's SCIENCE NEWS LETTER can be tested to determine how they perform under conditions simulating those found in space.

While mounted in the room, an antenna receives only the signals directly transmitted to it. Porous plastic material covering the walls, ceiling and floor, combined with sharply angled interior baffles, makes unwanted signal reflections and other interference negligible.

The accurate measurements of air navigation antennas are being made at International Telephone and Telegraph Corporation's Federal Division in Clifton, N. J.

Science News Letter, May 21, 1960

Do You Know

Some of the known causes of Parkinson's disease are: hardening of blood vessels, carbon monoxide poisoning, and certain virus infections.

Questions

EDUCATION—What percent of underprivileged teen-agers studied wanted a professional career? p. 326.

GENERAL SCIENCE—How has the National Science Foundation helped to end the "transition gap"? p. 322.

PSYCHIATRY—To what is the degree of improvement in alcoholics related? p. 323.

Photographs: Cover, International Telephone and Telegraph Corporation; p. 323, Smith, Kline & French Laboratories; p. 325, Boeing Airplane Company; p. 336, Empire Enterprises.

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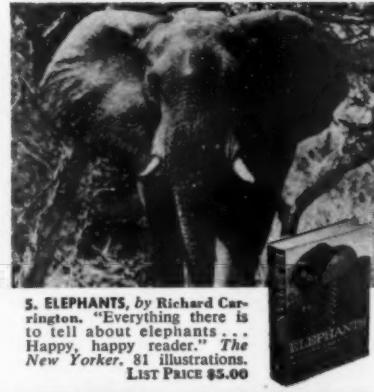
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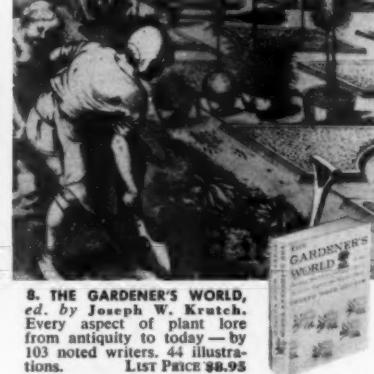
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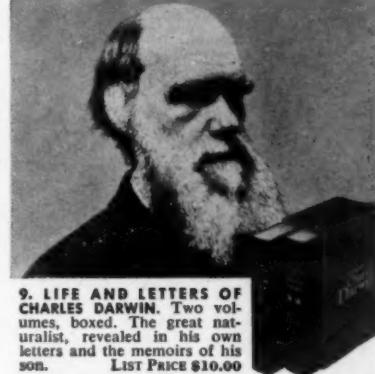
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Science News Letter, May 21, 1960

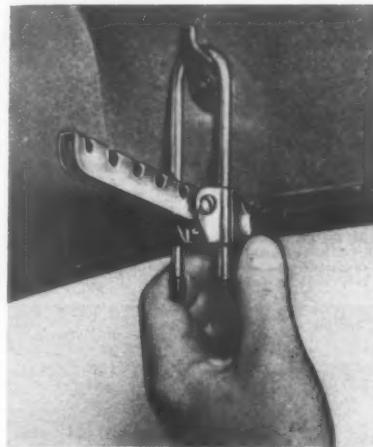
FLY CAKE, shaped like a doughnut, attracts flies to it and paralyzes them so they cannot fly away. They collect and die right around the cake. The fly-killer is useful in various areas around homes, barns, stables or restaurants. The manufacturer says the cakes, unless eaten in great quantity, will not hurt pets.

Science News Letter, May 21, 1960

STEAK BRANDING IRON lets guests at a big barbecue pick the steaks they like—“R” for rare, “M” for medium and “W” for well done. All three letters are set at various angles on this branding iron. The cook heats the iron and brands the steaks before cooking them. The iron has a hardwood handle and horsehide hanging thong.

Science News Letter, May 21, 1960

COAT HANGER RACK, shown in the photograph, slips over the coat hook in your car and juts out far enough to hold



five or more coat hangers. But it does not block rear vision. The rack lets you bring clothes from the cleaners without wrinkling them and, of course, is handy for travel.

Science News Letter, May 21, 1960

“SOAP” FLOAT, for play and sports in a swimming pool, is molded to look like a giant cake of soap. Because the float is a solid bar of white plastic, it cannot leak or

deflate. It is 24 x 15 x 4 inches in size and will support 200 pounds in the water.

Science News Letter, May 21, 1960

SEQUENCE TIMING BOARD operates three stopwatches at the same time by the squeezing of a handle on the board. With three stopwatches (not included) you can reset one watch at zero, stop a second and begin timing with the third, all in one motion. Each step under observation is timed in with the same motion that the preceding step is timed out.

Science News Letter, May 21, 1960

ELECTION GAME turns each player into a candidate for public office. Using his knowledge of U.S. geography, each player battles the others from state primaries right on through the national election.

Science News Letter, May 21, 1960

BROADCASTING HEARING AID has a tiny transistorized radio transmitter concealed in eyeglasses. Using subminiature battery cells, the transmitter broadcasts to a tiny receiver hidden in the ear. Because of no physical connection between the glasses and earpiece, the user may take off his glasses and wipe them without first removing the earpiece.

Science News Letter, May 21, 1960

Nature Ramblings

FEW FAMILIES of plants are as widely admired and cherished as the violets. From Shakespeare on down, poets have quickened to the inspiration of this lovely bloom.

Four of our states, Illinois, New Jersey, Rhode Island and Wisconsin, have joined in its praise and chosen the violet as their state flower. No other flower has been honored by as many states.

While the violets comprise a comparatively small group, only about 16 genera and 800 species, they are distributed almost throughout the world, even in the arctic and antarctic.

In the tropics, some become shrubs or even trees. In our area, however, they are mostly small delicate herbs with a grace and charm all their own.

Whether violets are true first signs of spring is immaterial. Certainly they herald the end of winter as much as the rose heralds summer.

By the time they become abundant in the

Violets



woods and windblown grasses of the open prairies, there is no doubt that spring has come for good.

Happily, violet blossoms may be picked freely without fear of depletion, as long as the roots are not pulled out of the earth. Relatively few of the seeds needed for propagation are formed by the bright little flowers that people love to gather.

Violets are remarkable for the very characteristic shape of their flowers and for

for the fact that most species regularly bear two kinds of flowers.

One type is the well-known petal-bearing kind; the other, a late-season, inconspicuous “cleistogamous” flower, which does not open up to be pollinated by insects.

American violets are conveniently divided into two main groups, the stemmed and the stemless.

Best-loved of all native violets is perhaps the birdfoot violet that inhabits dry fields and open woods from Massachusetts to Minnesota, south to Florida and Louisiana. Its showy flower, produced from April to June, has two upper petals of dark violet and three lower petals of lilac-purple.

An especially handsome species is the Confederate violet, which prefers rich shaded soil from the Carolinas and Kentucky to Arkansas and Georgia. Its abundant flowers are grayish in color. Other species may be white, cream-colored, yellow or combinations of these colors.

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